WAVE AND TIDE ACTUATED ENERGY PUMP

CROSS REFERENCE TO RELATED APPLICATIONS

Provisional patent application serial number 60390421, filed June 24, 2002, by current applicant, Richard Newton Hill, Jr., entitled "WAVE AND TIDE ACTUATED PUMP." Applicant claims use of this prior filing date.

BACKGROUND OF INVENTION

This wave and tide actuated pump will satisfy most of the world's energy requirements. By harnessing ½ of 1% of the renewable energy in the ocean waves, the entire world's energy needs can be met. This pump will replace oil, gas, coal and nuclear power as primary sources of energy. It is these sources of energy that are causing pending and future conflicts in the Middle East and the world.

More importantly, by the year 2025 the world will run out of food and water sufficient to support the world's population. This pump again provides the answer.

This pump is the best deterrent to war that we have.

SUMMARY OF INVENTION

This invention is designed specifically with deep water applications in mind, using the length of the pumping cylinder and the depth of the sea or medium in which it used to accommodate changing wave and tide conditions. Rather than being hindered by the depth of the sea, this invention takes advantage of it. This invention and design is simplistic and robust enough to withstand the most severe rigors of the oceanic environment. This invention is equally suitable for shallower waters when imbedded or used in an excavation of sufficient depth in the fluid or ocean bed.

The molecular excitation that causes the body of water to raise and lower as a wave or ocean swell is not re-

stricted to the surface of the body of water but continues down several feet from the surface. The buoy diameter is thus determined by the depth of wave action below the surface and by the amount of surplus buoyancy needed to raise the buoy, as close as possible, to same speed as the wave is traveling vertically. Typically, a wave action is transmitted approximately 15 feet beneath the surface. Ideally, the buoy should displace water down to the maximum depth of the wave action and the piston weighted according to this displacement. An additional volume of buoyancy is added sufficient to insure the buoy travels upward, as close as possible, to the same speed of the wave in its' up and down motion but not sufficient enough to keep from positioning buoy within the desired angle of repose in ocean currents with the aid of additional mooring lines if necessary.

I have determined several significant uses for this pump. Some of which are —

1. Pump the ocean water over, around or tunnel through, obstructions such as mountain ranges, spread the ocean water out on the desert floor. The resultant evaporation shall form clouds and the prevailing winds will carry the moisture to the next natural or man made barrier, causing rain to fall. In addition, hydro-electric power shall be created. The resultant salt water basins created shall be used to concentrate and extract minerals from the sea as well as removing man made pollutants from the world's oceans. Surplus sea water shall be allowed to flow back into the ocean. Once the feasibility is proved , Morocco with the Atlas Mountains and the Sahara need to be a top priority. The Western United States should prove to be an excellent model for what can be done in the rest of the world. The creation of this new farmland, water and energy will eliminate current and future world conflicts and, God willing, shall give us peace and prosperity for ONE THOUSAND YEARS!
2. Creation of Hydro-electric power. Either directly pumping the water to a submerged turbine with surge tank or by pumping the water behind a dam and allowing it to flow out uniformly to hydro-electric turbines. The surplus energy should make coastal states the most financially solvent and prosperous states in the US while consumer energy bills drop to an insignificant cost and energy rationing is eliminated.
3. Desalination Of Sea water. The energy pump can be the source of power for conventional desalination plants, dramatically reducing the cost of operation as energy consumption will now be a minimal factor, making

desalination of sea water practical in fresh water deprived parts of the world.

4. Seafood Farming: Pump sea water to a levied area and raise fish or shrimp, etc.. When ready for harvest, let the water out through the levee's flood gate and scoop up the fish or shrimp by hand or mechanically, eliminating the need for shrimp and fish trawlers, while guaranteeing a full harvest. This is similar to what is being done in some other countries now, using their high tides to capture the water behind levees.

5. Land Reclamation from the sea, etc.: Again, a levee would be thrown up with the pump on the ocean or sea side. The suction would run under the levee and excavate the water behind the levee, leaving dry land.

6. In the "dead" areas of the ocean: Where oxygen has been depleted, killing off marine life, the pump would be used to circulate oxygen rich water in, eliminating the "dead" area of the sea.

7. Oil and contaminant reclamation: At surface level, a containment barrier, as is used today, would be put in place. A skimmer funnel would be placed inside the containment area just below the surface, its' suction leading back down to one or more pumps. The contaminants could be pumped up to a Tender, where further skimming would transpire. A final phase can be introducing the oil/sea water mix into boiling brine. The difference in the specific gravity the three materials would allow for a clean cut, removing the remaining and now useable oil. Alternatively, the contaminants could be pumped to a levied area on shore for further processing, containment confinement and removal. A similar process, but with the suction at the bottom of the ocean, can be developed for crude such as Bunker "C", which have a tendency to remain on the seabed floor and eventually wash ashore in balls of oil/sea water contaminants.

BRIEF DESCRIPTION OF THE DRAWINGS

Sheet 1 of 10 shows the lifting buoy, connecting chain or cable and a cross section of the pumping mechanism to be mounted on the bed of the ocean and sea floors.

Sheet 2 of 10 shows the lifting buoy, connecting chain or cable and a cross section of the pumping mechanism as to be designed to be imbedded in the bed of the ocean and sea floors.

Sheet 3 of 10 shows the lifting chain and a closer look at the cross section of the pumping mechanism as prepared for imbedding in the ocean floor.

Sheet 4 of 10 shows the weighted piston with "O" rings and a cross section revealing the air vent check valve.

Sheet 5 of 10 shows the weighted piston without "O" rings and air vent.

Sheet 6 of 10 shows a closer look at the lifting buoy and connections.

Sheet 7 of 10 is an isometric rendition showing what the wave and tidal pump will look like when installed on the bed of the ocean floor.

Sheet 8 of 10 is an isometric rendition showing what the wave and tidal pump will look like when installed imbedded in the bed of the ocean floor.

Sheet 9 of 10 is an isometric rendition showing wave and tidal pumps being used in concert and in clusters.

Sheet 10 of 10 is a flow chart showing process applications of this wave and tide actuated pump.

DETAILED DESCRIPTION OF INVENTION

The buoy 1, shown in figures 1,2, 6,8 and 9 is sufficient in size to capture as much wave energy as is practical. The buoy 1, has a lifting eye or anchorage 2 in which a shackle 21 or clevis is secured. A chain or cable 4, is attached to shackle 21. An additional mooring eye 3 is provided for anchorage to tether the buoy 1 against strong prevailing currents such as the Gulf and Japanese Streams off the respective east and west coasts of the US.

A second shackle or clevis 16 is attached to eyebolt 17 shown in figure 3. The eyebolt 17 is imbedded in the weighted piston 8, figures 3 and 4. The weighted piston 8, may have one or more sealing rings 9, figures 1,2,3 and 4. The bottom ring 9 provides the primary seal while the upper ring 10 stabilizes the direction of travel as well as providing a second seal. An air vent 18 with check valve ball 19 and air vent chamber 34, figure 4 is provided in the weighted piston 8 to prevent air entrapment. The ball 19 falls to the bottom of vent chamber 34 when air is trapped below. The air passes by the ball 19. When water enters the vent 18 and chamber 34 from below, the ball 19 becomes buoyant, rising to the top of the vent chamber 34, sealing the flow of water but not air. The ratio of the volume of water displaced by larger pistons 8 in relation to the amount of water capable of escaping between the wall of the cylinder, figures 1,2,3,6 and 7, and the piston 8 may be sufficiently small to negate the neet chamber 34 and check valve ball 19.

Figures 1,2 and 3 show a mooring guide 5. Figure 3 shows the mooring guide 5 with wear ring 20. The mooring guide 5 and wear ring 20 facilitate lining the lifting chain 4 over the center of the piston 8 and eyebolt 17.

Figures 1,2 and 3 show stop pins 6 which restrict the upper reaches of the path of piston 8. The whole system is anchored with such sufficiency as to resist the entire submersion of buoy.

Figures 1,2,3,6,7 and 8 show the pump cylinder 7 whose inner surface provides the seal for the piston rings 9 and

10. The length of pump cylinder 7 determines the maximum variance of tide and wave actions allowed in the performance of the pump and is key to this invention.

Figures 1,2,3,6,7 and 8 show the inlet check valve 11 which allows one way travel of water into the cylinder 7 when piston 8 is raised by buoy 1. Check valve 11 does not allow flow out of the cylinder 7. In the same figures, check valve 12 allows the one way travel of water out of cylinder 7 when the weighted piston 8 travels downward when buoy 1 descends to the bottom of a wave or ocean swell. Check valve 12 prevents and stops the travel of water back into cylinder 7.

Figures 1, 6 and 8 show a bottom flange plate 13 attached to the pump cylinder with bolt holes 14 for securing pumping cylinder 7 and related mechanisms to a suitable submerged foundation on the bottom of the ocean and ocean floor.

Figures 2,3 and 7 show bottom plate 15, suitable for imbedding the pump cylinder in the ocean floor.

Figure 8 shows the pump cylinder 7 imbedded in the ocean floor 36 in the protective casing 23, with support plates 24, 26 and 35 bracing and holding cylinder 7 in place. Support plate 24 is equipped with opening 22 to allow for the flow of water to the check valve 11 below. Support plate 35 is similarly equipped with a check valve 11 mounted on top and a 90 degree elbow 25 mounted below allowing for the one way flow of water into the cylinder 7. The weighted piston 8 and buoy 1 perform in their usual manner pumping water out of cylinder 7 into the pressure side 90 degree elbow 27 through plate 35 via discharge pipe 28, a second 90 degree elbow 29 through the one way pressure side check valve 12 thence to discharge pipe 30.

Figure 8 is an isometric representation showing 36 wave and tide actuated pumps, mounted on the ocean floor, being used in concert, connected together with piping 31. A final one way pressure check valve 33 may be provided at the last outlet as a safety measure.